

Applicant : Raymond W. Zeng et al.
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Intel Corporation Docket No.: P12428

IN THE CLAIMS:

Please amend the claims as follows:

Claims 1 and 2 (Cancelled)

Claim ²~~3~~ (Currently Amended) The method of claim ¹~~2~~, wherein the first output signal has a voltage level of 7 volts and a voltage level of 5 volts and the second output signal is 5 volts.

Claim 4 (Cancelled)

Claim ¹~~5~~ (Currently Amended) A method of providing multiple voltage outputs,

comprising:

receiving an input signal from a multifunctional pump configured to provide more than two voltage levels, the multifunctional pump comprising:

clock drivers including a first clock driver, a second clock driver, a third clock driver, a fourth clock driver and a fifth clock driver; and

arrays including a first array, a second array, a third array, a fourth array and a fifth array, each array configured to receive input from one corresponding clock driver, each array and corresponding clock driver being in a parallel circuit to the other arrays and corresponding clock drivers, each array comprising a circuit array configured to form a voltage pump, the input signal comprising an array output signal from at least one array;

sending a first output signal based on the input signal using a first switch;

sending the input signal to a transistor;

sending a second output signal received from the transistor via a second switch; and

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comparing a reference voltage and a feedback voltage, received from the transistor, using a first comparator to provide a comparator result, the first comparator being coupled to a gate of the transistor to control the transistor based on the comparator result.

~~The method of claim 1, wherein the multifunctional pump is a circuit comprises:~~
~~a first array receiving input from a first clock driver;~~
~~a second array receiving input from a second clock driver, the second clock driver and the second array being in parallel to the first array and the first clock driver;~~
~~a third array receiving input from a third clock driver, the third clock driver and the third array being in parallel to the second array and the second clock driver;~~
~~a fourth array receiving input from a fourth clock driver, the fourth clock driver and the fourth array being in parallel to the third array and the third clock driver; and~~
~~a fifth array receiving input from a fifth clock driver, the fifth clock driver and the fifth array being in parallel to the fourth array and the fourth clock driver;~~
~~wherein each array is a circuit array configured to form a voltage pump.~~

^{3.}
Claim ~~6~~ (Previously Amended) The method of claim ¹~~5~~, wherein the multifunctional pump further comprises:

an oscillator providing a clock signal to each of the clock drivers; and
a second comparator providing input to the oscillator, the second comparator comparing the output from the arrays with a predetermined voltage.

^{4.}
Claim ~~7~~ (Previously Amended) The method of claim ³~~6~~, further comprising:

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placing the multifunctional pump in a standby mode when the first clock driver is enabled by a first signal.

^{5.}
Claim ~~8~~³. (Previously Amended) The method of claim ~~6~~³, further comprising:

placing the multifunctional pump in a read mode when the second clock driver is enabled by a second signal and the first array is on.

^{6.}
Claim ~~9~~³. (Previously Amended) The method of claim ~~6~~³, further comprising:

placing the multifunctional pump in a program mode when the third clock driver, the fourth clock driver, and the fifth clock driver are enabled by a third signal and the first array and the second array are on.

^{7.}
Claim ~~10~~³. (Previously Amended) The method of claim ~~6~~³, further comprising:

placing the multifunctional pump in an erase mode when the third clock driver, the fourth clock driver, and the fifth clock driver are enabled by a third signal and the first array and the second array are on.

Claims 11 and 12 (Cancelled)

⁸
Claim ~~13~~⁹. (Currently Amended) The apparatus of claim ~~12~~⁸, wherein the first output signal has a voltage level of 7 volts and a voltage level of 5 volts and the second output signal is 5 volts.

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Claims 14 (Cancelled)

~~Claim 15.~~ ⁸⁻ (Currently Amended) An apparatus for providing multiple voltages,

comprising:

a multifunctional pump configured to provide more than two voltage levels, the

multifunctional pump comprising:

clock drivers including a first clock driver, a second clock driver, a third clock driver, a fourth clock driver and a fifth clock driver; and

arrays including a first array, a second array, a third array, a fourth array and a fifth array, each array configured to receive input from one corresponding clock driver, each array and corresponding clock driver being in a parallel circuit to the other arrays and corresponding clock drivers, each array comprising a circuit array configured to form a voltage pump;

a first switch receiving input from the multifunctional pump and providing a first output signal;

a transistor receiving input from the multifunctional pump;

a first comparator coupled to a gate of the transistor to control the transistor based on a comparator result, the first comparator comparing a reference voltage and a feedback voltage, received from the transistor, to provide the comparator result; and

a second switch, coupled to the transistor, providing a second output signal.

The apparatus of claim 11, wherein the multifunctional pump comprises:

a first array receiving input from a first clock driver;

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~~a second array receiving input from a second clock driver, the second clock driver and the second array being in parallel to the first array and the first clock driver;~~

~~a third array receiving input from a third clock driver, the third clock driver and the third array being in parallel to the second array and the second clock driver;~~

~~a fourth array receiving input from a fourth clock driver, the fourth clock driver and the fourth array being in parallel to the third array and the third clock driver; and~~

~~a fifth array receiving input from a fifth clock driver, the fifth clock driver and the fifth array being in parallel to the fourth array and the fourth clock driver;~~

~~wherein each array is a circuit array configured to form a voltage pump.~~

^{10.} Claim ~~16~~⁸. (Previously Amended) The apparatus of claim ~~15~~, wherein the multifunctional pump further comprises:

an oscillator providing a clock signal to each of the clock drivers; and

a second comparator providing input to the oscillator, the second comparator comparing the output from the arrays with a predetermined voltage.

^{11.} Claim ~~17~~¹⁰. (Previously Amended) The apparatus of claim ~~16~~, wherein the multifunctional pump is in standby mode when the first clock driver is enabled by a first signal.

^{12.} Claim ~~18~~¹⁰. (Previously Amended) The apparatus of claim ~~16~~, wherein the multifunctional pump is in read mode when the second clock driver is enabled by a second signal and the first array is on.

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13. 10

Claim ~~19~~. (Previously Amended) The apparatus of claim ~~16~~, wherein the multifunctional pump is in a program mode when the third clock driver, the fourth clock driver, and the fifth clock driver are enabled by a third signal and the first array and the second array are on.

14. 10

Claim ~~20~~. (Previously Amended) The apparatus of claim ~~16~~, wherein the multifunctional pump is in an erase mode when the third clock driver, the fourth clock driver, and the fifth clock driver are enabled by a third signal and the first array and the second array are on.

Claim 21-25 (Cancelled)